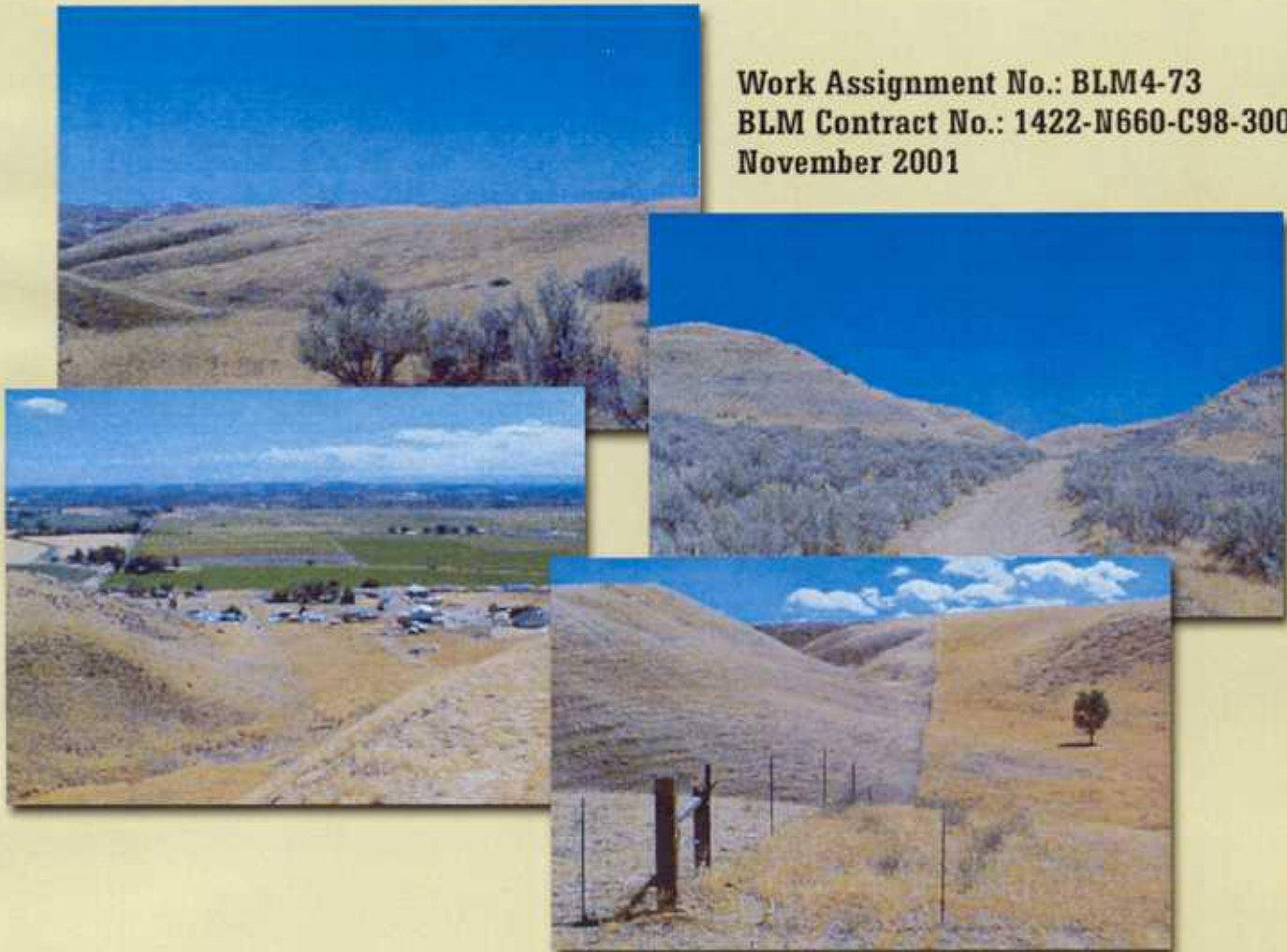


WILDLAND-URBAN INTERFACE COMMUNITIES-AT-RISK PROGRAM

**Final Mitigation Plan Report
Lower Snake River District
Payette Assessment Area**

**Work Assignment No.: BLM4-73
BLM Contract No.: 1422-N660-C98-3003
November 2001**



DYNAMAC
CORPORATION

**FINAL
WILDLAND-URBAN INTERFACE COMMUNITIES-AT-RISK
MITIGATION ASSESSMENT**

**LOWER SNAKE RIVER DISTRICT
PAYETTE ASSESSMENT AREA**

Prepared for:

**U.S. Department of Interior
Bureau of Land Management
Lower Snake River District
Boise, Idaho**

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**Work Assignment No. BLM4-73
Date Prepared: November 2001
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1.0 EXECUTIVE SUMMARY

During the 2000 fire season more than 6.8 million acres of public and private lands were burned by wildfire, resulting in loss of property, damage to resources, and disruption of community services. Many of these fires occurred in wildland-urban interface areas and exceeded fire suppression capabilities. To reduce the risk of fire in the wildland-urban interface, the President of the United States directed the Secretaries of the Departments of Agriculture and the Interior to increase federal investments in projects to reduce the risk of wildfire in the wildland-urban interface. To this end, the Bureau of Land Management (BLM), Lower Snake River District is currently in the process of forming partnerships with local governments to plan fuels reduction treatments and other mitigation measures targeted at the wildland-urban interface in the vicinity of Federal lands. These partnerships are indicative of a shared responsibility to reduce wildland fire risks to communities.

The wildland-urban interface occurs where human structures meet or intermix with wildland vegetation. In certain situations, specific actions such as fuels reduction around communities, forest and rangeland restoration, infrastructure improvements, and public education and outreach may reduce the risk of catastrophic fire in the wildland-urban interface. To this end, the BLM implemented the Communities-at-Risk Wildland-Urban Interface Program. The program seeks to reduce the hazard of wildland fires to communities through public outreach, the reduction or prevention of fuel build-up, and increasing the fire protection capabilities of communities. The Payette community was selected by the BLM to assess the hazard of wildland fire and to identify specific actions that may reduce the risk.

Dynamac Corporation was contracted to support the BLM in their assessment of wildfire risk to the Payette community in the wildland-urban interface. Dynamac scientists conducted fuel surveys by categorizing the vegetation, slope, and aspect of the land in the Payette assessment area. The risk of wildland fire to homes, structures, and cultural resources on private land was also evaluated according to building materials, the presence of survivable space, road access, and the response time of the local fire department. Dynamac assessed the adequacy of the community's service infrastructure (including roads, water supplies, and fire fighting equipment) by systematic observation, and by interviewing community officials and fire prevention personnel. A community open house was held to disseminate information about the Communities-at-Risk, Wildland-Urban Interface Program to citizens, to afford them the opportunity to identify resources that are of value to the community, and to have them identify actions that may reduce the risk of wildland fire. The information gathered from the fuel surveys, structural surveys, interviews, infrastructure assessments, and community profile was

integrated into two reports: a hazard assessment report and a mitigation report. The following action items were identified to reduce the wildfire threat in the Payette assessment area based on the synthesis of the two reports:

- Provide assistance to the Payette Rural Fire Department in obtaining an additional tender pumper;
- Extend water line on 7th Avenue to Payette Heights Road;
- Establish a firebreak around the perimeters of the landfill and the road leading to the landfill and re-planting with less flammable vegetation to lower the fuel load and prevent soil erosion; and
- Develop an on-going education and outreach program to encourage firewise practices by the residents of Payette.

2.0 GOALS AND OBJECTIVES

The goals and objectives of the Payette wildfire hazard assessment and mitigation plan are to evaluate the hazards of wildland fire within the assessment area and then identify specific actions that could reduce the risks. The objectives are to decrease the chances of wildfire spreading from BLM lands onto private lands, while correspondingly decreasing the risk of wildfire spreading from private lands onto BLM lands.

3.0 BACKGROUND

Wildland fire is an integral component of many forest and rangeland ecosystems. In the conterminous United States before European settlement, an estimated 145 million acres were annually scorched by wildfire. In comparison, only about 14 million acres are currently burned annually due to increased agriculture, urbanization, habitat fragmentation, and fire suppression programs. This change from the historical fire regime to the present day has caused a shift in the native vegetation composition and structure of fire-prone ecosystems such as some forests and rangelands resulting in a dangerously high accumulation of fuels. As a result, when wildland fires do occur, they may burn larger and hotter than those in the past and pose an increased risk to human welfare and ecological integrity.

The hazard of wildland fires is compounded by the increasing occurrence of human structures and activities in fire-prone ecosystems. The wildland-urban interface occurs where human structures meet or intermix with wildland vegetation. In certain situations, specific actions such

as fuels reduction around communities, forest and rangeland restoration, infrastructure improvements, and public outreach may reduce the risk of losses to catastrophic fire in the wildland-urban interface. To this end, the BLM implemented the Communities-at Risk Wildland-Urban Interface Program. The program seeks to reduce the hazard of wildland fires to communities through public education and outreach, the reduction or prevention of fuel build-up, and increasing the fire protection capabilities of communities. The Payette community was selected by the BLM to assess the threat of wildland fire and to identify specific actions that may reduce the risk of loss.

4.0 EXISTING SITUATION

Payette is located on the Snake River on the Oregon-Idaho border across from the city of Ontario, Oregon. Payette is a small community of approximately 7,000 people situated at the confluence of the Snake River and Payette River in southwestern Idaho. The western border of Payette is the Snake River, which is also the Oregon-Idaho border at that point. Payette is the county seat of Payette County and includes the offices of all county officials, including county commissioners, Sheriff and Disaster Services Director, and Planning and Zoning. The community grew out of a construction camp for the Oregon Shortline Railroad in the 1880s. The town is situated at 2,150 feet above mean sea level and enjoys warm dry summers and cool, relatively dry winters. The valley in which Payette is located is ‘famous’ for its fruit and row crop farming. The city has an active Chamber of Commerce and many active civic groups, including Lions, Kiwanis, and the American Legion. Today, Payette is best known for its bountiful crops, its expanding industrial production, and its friendly, hospitable people.

The assessment area consisted of portions of townships T07N R05W; T08N R02W; T08N R03W; T08N R04W; T08N R05W; T09N R02W; T09N R03W; T09N R04W; T09N R05W; T10N R03W; T10N R04W; and T10N R05W (**Map 1**). The town of Payette can be reached by traveling west from Boise, Idaho on Interstate 84 to Exit 3 and traveling north on Highway 95.

The topography of the assessment area is relatively flat with an average elevation of approximately 2,500 feet; the area slopes upward from the Snake River plain at 2,100 feet to 3,000 feet east of town. Rangeland, agriculture, and urban (developed commercial and residential) are the main land uses in the assessment area. Open bodies of water include the Snake River, Payette River, and several large irrigation canals. The dominant vegetation is foothills and disturbed grassland; medusahead, cheatgrass and other annual weeds are widespread throughout the assessment area and pose a hazard as flammable fuels. Agricultural

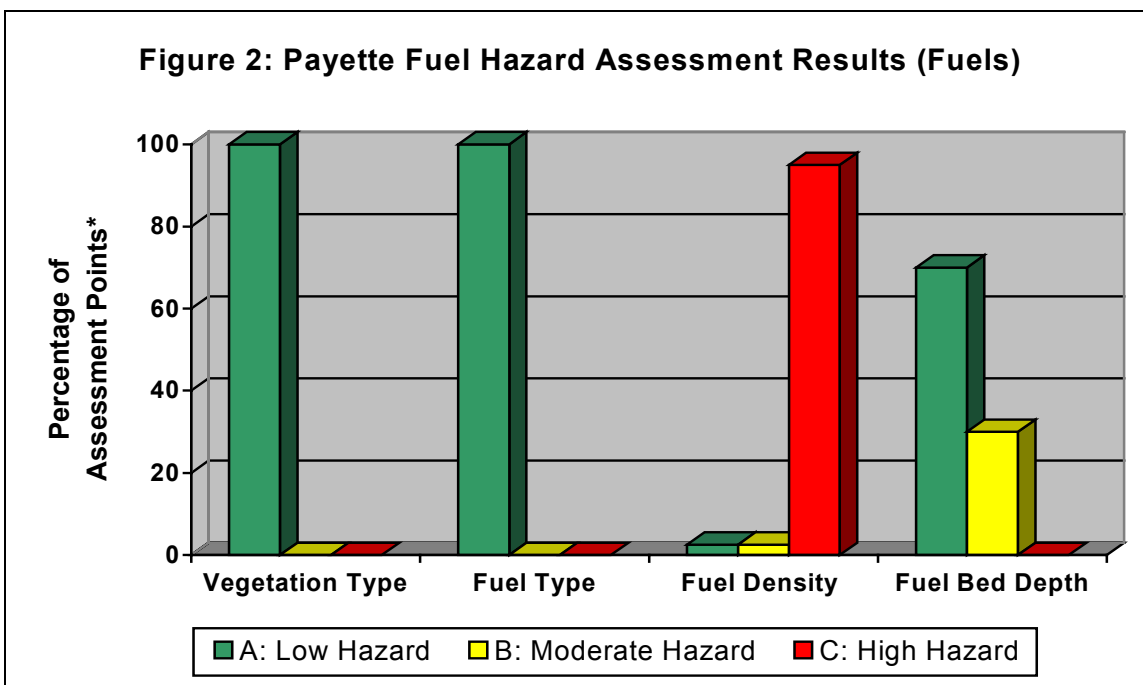
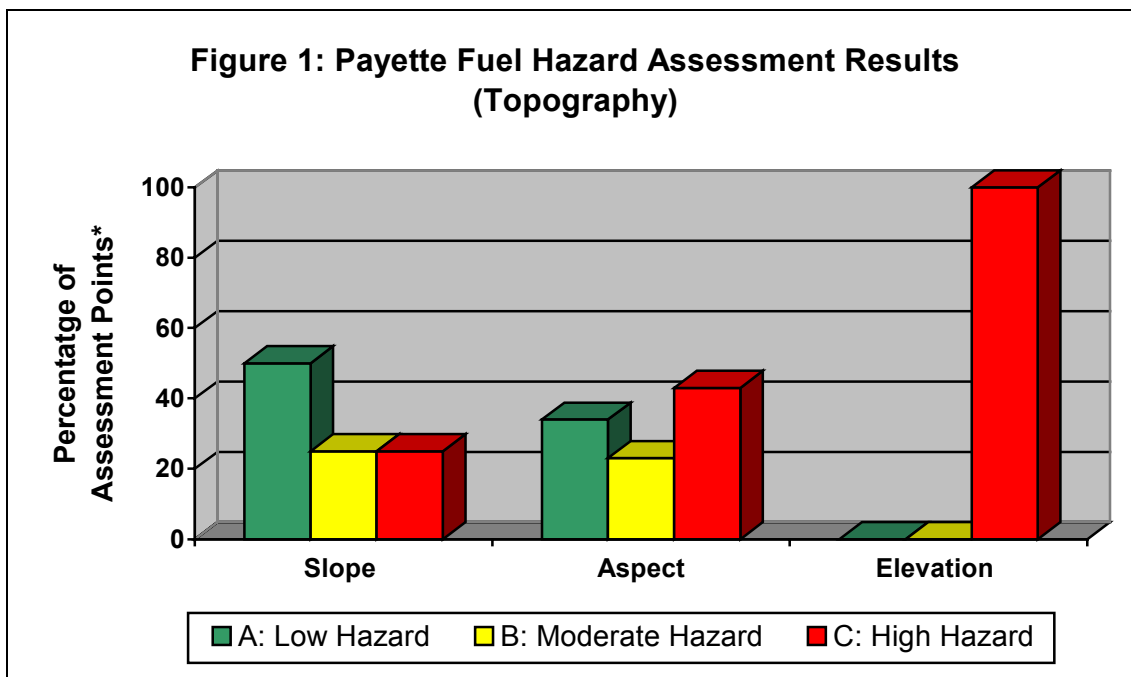
production includes wheat, alfalfa, orchard crops, and dairy and beef. Most of the crops are irrigated. The rangeland is important for wildlife habitat, recreation, and livestock grazing.

The climate of the Payette area is characterized by hot, dry summers with average daily high temperatures reaching 92° F in July, and average daily summertime low of 57° F. Winter months are typically cool, with average daily temperatures from November to March ranging from the high 50's to the low 20's. Precipitation is typically low with an average annual precipitation of 10.78 inches. Most precipitation arrives during the November to January time period as snowfall (WRCC, 2001).

The dominant hazardous fuels in the assessment area are grasses, weeds and small shrubs. Cheatgrass and medusahead were the predominant light fuel identified throughout the assessment area. Bunchgrasses such as crested wheatgrass, bluebunch wheatgrass, and Idaho fescue were observed at a few of the sites, and probably occurred in response to past seeding projects. Basin and Wyoming big sagebrush were the dominant shrubs in the assessment area. Rabbitbrush occurred on disturbed areas. Generally, shrub cover was probably insufficient to carry a fire without a continuous understory or strong wind. However, in locations dominated by medusahead, fires may be difficult to extinguish, as the grass forms a mat that readily re-burns. The results of the fuel survey are summarized as follows:

- **Slope:** Fifty percent of the survey sites occurred on slopes that were greater than 30 percent. The remaining sites occurred in equal proportions on low or moderate slopes.
- **Aspect:** Thirty-four percent of the sites had northern exposures, 23 percent were on east (or relatively level) facing slopes, and 43 percent faced south.
- **Elevation:** The elevation for all of the survey sites was less than 3,500 ft.
- **Vegetation Type:** All of the sites received an “A” (low hazard) vegetation type rating because of the dominance of cheatgrass or medusahead.
- **Fuel Type:** All of the fuel survey sites were found to have small-diameter, light fuels.
- **Fuel Density:** Ninety-five percent of the sites had a continuous fuel bed because of the continuous nature of the understory grasses, especially cheatgrass. The remaining sites had non-continuous or broken moderate fuel density.
- **Fuel Bed Depth:** Seventy percent of the sites had a fuel bed depth of less than one foot, while 30 percent had a fuel depth between one and three feet.

The results of the Fuel Hazard Assessment are also graphically illustrated in **Figures 1 and 2**. The graphs depict the percentage of assessment point that received a high, moderate, or low hazard ranking.



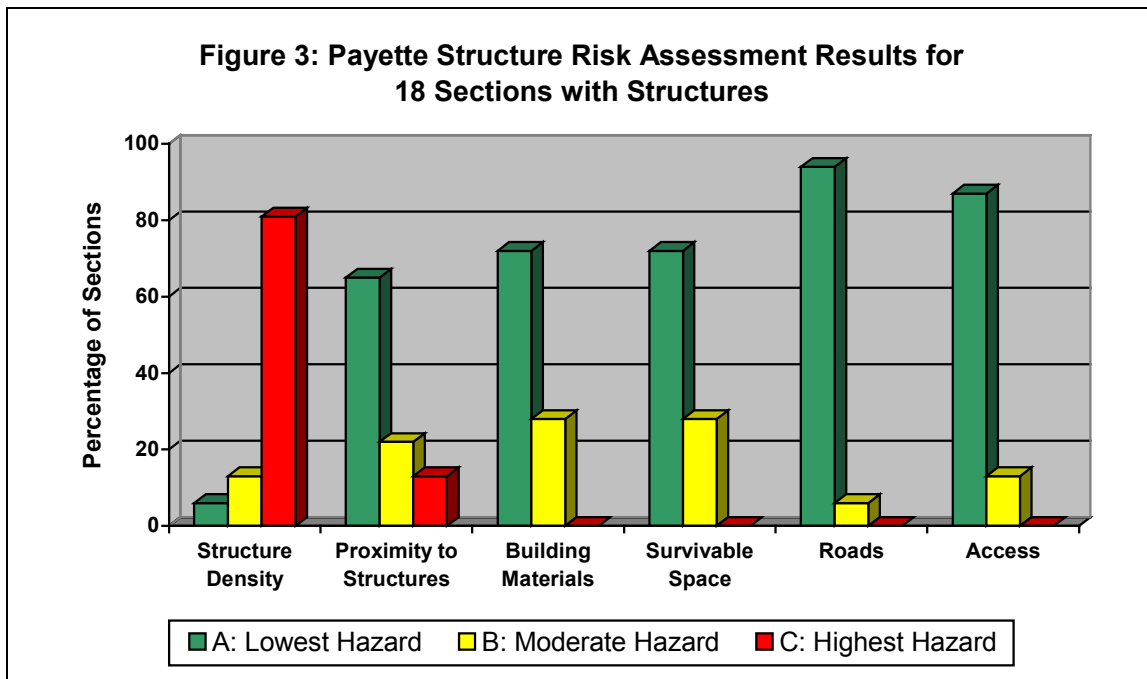
*Based on 50 points surveyed

In addition to the hazardous fuels assessment, a structural survey was conducted and it also was reported in the hazard assessment. Over 100 square-mile sections were evaluated, and 82 of those sections did not have structures such as homes or buildings. The majority of structures were homes and buildings associated with residential development. The main points of the structural fire hazard assessment field survey are as follows:

- **Structure Density:** Eighteen sections were evaluated for structures and 81 percent of these rated as “less than one structure per 10 acres” (Class C). Six percent of the sections had at least one structure per 5 acres (Class A) and 13 percent had one structure per 5 to 10 acres (Class B).
- **Proximity to Structures:** Two-thirds of the sections were rated as having flammable wildland fuels greater than 100 feet from the structures. Twenty-two percent had wildland fuels 40 to 100 feet and 13 percent had fuels within 40 feet of the structures.
- **Predominant Building Materials:** Seventy-two percent of sections were rated as having the majority of homes with fire resistant roof and/or siding (Class A), and the remainder were rated as Class B.
- **Survivable Space:** Seventy-two percent of the sections contained improved survivable space around the homes (Class A) and the remaining 28 percent of the sections were rated as having homes with 10 to 50 percent survivable space (Class B).
- **Roads:** All but one of the sections (94 percent) were rated with wide looped roads that were maintained, paved or solid, surfaced with shoulders (Class A). Six percent of the sections had maintained two lane roads with no shoulders (Class B).
- **Access:** Eighty-seven percent of the sections were identified as having multiple entrances and exits that were suitable for trucks with turnarounds (Class A). The remainder of the sites had limited access routes (Class B).

The percentages of assessment points that received a high, moderate, or low hazard ranking are graphically depicted in **Figure 3**. It should be noted that the percentages depicted in this chart are based on the 18 sections *with structures*, not the 100 sections surveyed within the assessment area (82 of which had no structures). Response times are not depicted because these were all within 40 minutes within the *entire* assessment area (100 percent were rated moderate risk.)

The areas of greatest risk in terms of fuels and fire suppression are depicted on **Map 3**, in the Appendix.



5.0 SUGGESTED ACTIONS AND DESIRED CONDITIONS

Through discussions with community leaders, fire officials, disaster coordinators, and residents of Payette and the surrounding wildland-urban interface lands, the following actions were suggested to improve fire preparedness and prevention measures along the Wildland-Urban Interface. Some of these have been developed into recommendations (See Section 8.0, Proposed Projects and Priority) for lessening the risk posed by fire.

- Area-wide adoption of firewise practices in residential and commercial building and landscaping.
- Coordination and cooperation between the town of Payette and officials of Payette County to improve consistency of Planning and Zoning Laws between the town and county;
- The award of a \$26,000 grant by FEMA to the Payette RFD for materials for the construction of a “training trailer” that could be taken around the county to educate the local citizenry about firewise homebuilding, landscaping, and defensible space. If this grant were to be awarded, it would help if land management agencies such as BLM and Idaho Department of Lands would assist in supplying the trailer with firewise educational materials, and jointly manning the trailer with the PRFD when it was taken around the county for educational purposes;

- A buffer zone or brown strip around the motorcycle park and landfill. Improvements of Landfill Road.
- A new “tender” (fire truck), brush unit, and pumper truck for the Payette RFD
- Extension of existing water lines to meet the needs of new residential development.

6.0 NEED FOR ACTION

Wildfire frequency in the Payette assessment area is common and results from both natural and human causes. During the week Dynamac performed its assessment, the smoke from at least three different fires was noted in the area surrounding the town. To reduce the risks of wildfire in the assessment area both general and specific actions are needed.

7.0 METHODOLOGY

The mitigation actions proposed herein for the Payette assessment area are based on information acquired from fuel and structure surveys, a public meeting, interviews of community officials, and surveys filled out and submitted by residents of the town. The majority of information presented in this report was gathered during the time period between July 31 and August 5, 2001.

The fire hazard assessment area surrounding Payette was defined by BLM. The BLM assigned 50 fuel survey points in the assessment area to be evaluated by Dynamac (Map 1). The fuel survey points occurred in sections where BLM land occurred. The fuel survey focused on regions northeast of Payette city and in the eastern portion of the assessment area, as these were the locations of BLM land. At each survey point, digital photographs were taken of the surrounding area in the four cardinal directions. Also, a wildland fuels fire hazard assessment was completed which rated the characteristic of the land features and fuel sources. The rating elements included slope, aspect, elevation, fuel type, fuel density, and fuel bed depth, and were assigned to a risk category of low, medium, or high as defined by BLM (See Hazard Assessment Report, Table 3, and Appendix B).

Dynamac staff also collected information on the flammability and defensibility of structures on private land from over 100 sections located within one mile of BLM lands, within the assessment area. The structural hazard assessment rated the structures based on the resistance of building materials to fire, and the distance of flammable fuels to the structures located within a section. The rating elements included structure density, proximity of flammable fuels to the structures, building materials, survivable space, and types of roads, response times, and accessibility. Each

element was assigned a rating of low, medium, or high hazard category defined by BLM (See Hazard Assessment Report, Table 4, and Appendix C).

A public meeting was convened on July 31, 2001, at Payette City Hall from 6:00 to 9:00 p.m. The community was invited to attend through a newspaper article in the local paper and announcements posted in public places such as grocery stores and the post office. Dynamac and BLM staff attended the public meeting to hand out firewise brochures, obtain information from the community on hazardous fire situations and desired conditions, and be an informational resource to those attending the meeting. Turnout from the public was very low.

The Dynamac Community Relations Specialist conducted interviews with numerous local public officials and residents. Individuals or groups interviewed included Payette County Commissioners, various BLM representatives, the fire chiefs of the Payette and New Plymouth Fire departments, the Sheriff and Disaster Services Coordinator, and the County Building Officer from the Planning and Zoning Department (See Hazard Assessment Report, Appendix E).

8.0 PROPOSED PROJECTS AND PRIORITY

The projects proposed are based on information obtained from the fuel and structure surveys, community meeting, and interviews. The following specific action items were identified to reduce the hazard of wildfire in the Payette assessment area:

- Extend the 7th Avenue water line to Payette Heights Road;
- Assist the PVRFD in obtaining funding for an additional tender/pumper;
- Establish a firebreak along the road leading to the landfill and Highway 52, around the perimeter of the landfill itself, and around the motorcycle park. The road leading to the landfill should be graded in conjunction with this task. Green-stripping should be employed to decrease the fuel load and minimize soil erosion;
- Develop an on-going education and outreach program throughout the assessment area to encourage firewise practice.

The locations of the water line extension and the proposed firebreaks and fuels reduction areas are illustrated on **Map 3**.

8.1 Community Infrastructure Improvements and Local Fire Department Assistance

Purpose of Improvements: The efficiency of the PRFD would be enhanced and response times shortened by the addition of a larger 3,000-gallon tender. The larger tender would require less refilling than the existing brush trucks. Furthermore, adding a new truck would allow the PRFD to respond to more than one fire at a time.

Another enhancement sought by the PRFD is an extension of an existing water line from 7th Avenue to Payette Heights Road. This extension of the water supply would allow faster response to rapidly developing residential areas.

Necessity for assistance: The residential component of Payette may outgrow the capabilities of the PVRFD in the future. Payette is a growing community. New residential areas and schools are being established in areas of the town north of Payette in Payette Heights. Because some of this development is within one mile of the wildland interface, it is appropriate for BLM to assist the PVRFD in implementing these improvements.

8.2 Firebreaks and Fuels Reduction Recommendations

Construction of Firebreaks and Fuels Reduction: The BLM and private landowners should, through a partnership, cooperate in constructing a firebreak along the road leading to the landfill and along Highway 52, around the landfill, and around the motorcycle park. The firebreaks should be established on roads that are mainly located between BLM land and private land (**Map 3**). BLM owns all the land immediately surrounding the landfill and the road leading to it. In conjunction with the creation of these firebreaks, the road leading to the landfill should be graded or resurfaced. The road currently has an uneven surface, which causes automobile traffic traveling along the road to bounce, occasionally scraping the road. Automobile undercarriages create sparks when they scrape the road, which increases the likelihood of fires. Grading or resurfacing the road will reduce the likelihood of cars bouncing, and thus reduce the chances of sparks emitted and subsequent fires in the area.

Purpose of Firebreaks and Fuels Reduction: Replacement of highly flammable cheatgrass with less flammable vegetation such as sage and perennial grasses has been shown to be an effective method of reducing the risk of wildfire, and also of reducing a wildfire's rate of spread. Similarly, the creation of firebreaks, especially around areas such as the landfill that have demonstrated the likelihood to be a source of wildland-urban interface fires, creates a boundary that assists fire departments in containing the fire until it can be successfully put out.

Fuels Treatment: Mechanical treatment to reduce the amount of fuels along the roads selected for firebreaks would occur by mowing or disking the vegetation. A second option is the use of a herbicide such as Oust or Plateau. Oust has been successfully used to control cheatgrass and other annuals on rangeland but is currently not approved for continued use pending further investigation. Plateau is in the final testing phase for approved use. The fuels treatment should extend 100 feet on both sides of the road. Bunchgrasses should be seeded in late fall. After the bunchgrasses are established, then shrubs may be inter-seeded. The vegetation conversion would reduce the amount of flammable annual weeds to perennial grasses and shrubs that are considerably less flammable. The firebreaks would be located in strategic locations that can improve the wildfire suppression efforts in the assessment area. The establishment of the high-priority firebreaks and fuels treatments should occur first because these locations provide the best opportunities for success in aiding wildfire suppression efforts.

Locations of Firebreaks and Fuel Treatments: Map 3 shows the locations of the proposed high-priority firebreaks. Based on ownership, the BLM would be responsible for 75 percent and private landowners will be responsible for 25 percent of the creation of these high-priority firebreaks. A 50-50 percent split between the BLM and private landowners is estimated for the low-priority firebreaks.

Project Timing: BLM generally times projects in the following manner: Year One is the year identification and justification of projects occurs, and treatment objectives are determined. Field surveys begin. In Year Two projects that require compliance with the National Environmental Policy Act (NEPA) are planned, analyzed, and designed. Projects that do not require NEPA compliance begin implementation. In Year Three, NEPA projects begin implementation. All steps are contingent on available funding. In Year Four, post-treatment monitoring begins.

The road leading to the landfill should be graded as soon as possible; this method of risk reduction requires the least amount of equipment and coordination of resources. The high-priority firebreaks and fuels treatments should be planned in Year Two and implemented in Year Three. The mechanical or herbicide treatments may be most effective when the growing season is complete. The seeding of the bunchgrasses would be one year later in the fall. The schedule for the low-priority firebreaks should be similar to the high-priority firebreaks but occur after the latter are successfully established.

Treatment Necessity: The combination of firebreaks and fuel reduction has been shown to be effective around communities to reduce the risk of fire in the urban/wildland interface. A good

assessment of specific hazards and threats to a community will help identify problems and solutions for both federal and private landowners, and offer opportunities for partnerships and agreements. Treatments will aid in reducing the wildfire threat and risks of loss to existing homes in the vicinity of the firebreaks.

8.3 Community Education and Outreach Recommendations

Purpose of Public Education and Outreach: The purpose of the community-wide education program is to 1) educate the public of the dangers of wildfire in the area, 2) encourage residents to take responsibility in reducing the risk of wildfire and to create defensible space around their residence, and 3) increase awareness of the natural role of low-intensity fire in woodland or grassland ecosystems and the benefits of prescribed burning or occasionally managing natural wildland fires to achieve ecological benefits, while maintaining firefighter and public safety as the top priority. The public education and outreach program will be co-sponsored by the BLM and Payette Homeowners Association through a partnership agreement.

Outreach Occurrence: An annual “Firewise Clean-Up Day” is one tool that is recommended to encourage residents to create defensible/survivable space around their residence. In conjunction with the Firewise Clean-Up Day, specific demonstration projects may be designed and utilized to educate residents about longer-term investments they could make to increase fire safety. The clean-up day would occur in conjunction with public demonstrations, education programs, and speakers on wildfire and firewise practices.

Outreach Timing: The annual “Firewise Clean-up Day”, education program, and public demonstrations would be most effective in the spring to remind people to prepare their properties for the coming fire season.

Outreach Necessity: Citizen involvement in wildfire mitigation in and around communities is a necessary element for success. Public education and outreach is an effective means of engaging the public in the process of reducing risks to a community. Such education and outreach has been shown to motivate homeowners to take measures around their individual property, thereby contributing to the reduction of wildfire hazards in a community. Further, a community education and outreach program will help identify problems and solutions for both federal and private landowners, and offer opportunities for partnerships and agreements.

9.0 POTENTIAL SOURCES OF STATE FUNDING

Idaho Department of Lands representative Kurt Houston, who is based out of IDL's Boise office, provided the following information. Communities-at-Risk may benefit from these State-administered grant programs, which provide financial assistance for various types of fire safety-, fire suppression- and fire education-related projects, as well as stewardship activities.

Idaho Fire Assistance Program: A cost-share program designed to assist fire service organizations with organizing, training, and purchasing equipment for fire protection and suppression. Open application period is from May 1 through June 15 each year. Contact Fire Warden Kurt Houston at the Idaho Department of Lands office in Boise at (208) 334-3488 for more information and applications.

Volunteer Fire Assistance Program: A cost-share program with federal funds administered by the State of Idaho. The rural community must have a population of less than 10,000. Only those projects to organize, train, and equip fire service organizations qualify for financial assistance. Open application period is from October 1 through December 31 each year. Contact Fire Warden Kurt Houston at the Idaho Department of Lands office in Boise at (208) 334-3488 for more information and applications.

Federal Excess Personal Property Program: An equipment loaning program for fire service organizations with populations less than 10,000 residents. Usable fire related equipment is loaned to the organization until such time the organization no longer wants it. Titles for vehicles remain with the federal government. Applications are continuously accepted. Contact Fire Warden Kurt Houston at the Idaho Department of Lands office in Boise at (208) 334-3488 for more information and applications.

Forest Incentive Program: Federal cost-share funds administered by the Natural Resources Conservation Service (NRCS). The Forestry Incentives Program (FIP) supports good forest management practices on privately owned, non-industrial forest lands nationwide. FIP is designed to benefit the environment while meeting future demands for wood products. Eligible practices are tree planting, timber stand improvement, site preparation for natural regeneration, and other related activities. FIP is available in counties designated by a Forest Service survey of eligible private timber acreage. Depending on funding, the open application period varies. Contact the nearest NRCS or Tim Kennedy at the Boise IDL for more information and

applications. Additional information on the program and NCRS contacts is available at <http://id.nrcs.usda.gov/programs.htm>.

Stewardship Incentive Program: Federal cost-share funds administered by the NRCS. The Stewardship Incentive Program provides technical and financial assistance to encourage non-industrial private forest landowners to keep their lands and natural resources productive and healthy. Qualifying land includes rural lands with existing tree cover or land suitable for growing trees and which is owned by a private individual, group, association, corporation, Indian tribe, or other legal private entity. Eligible landowners must have an approved Forest Stewardship Plan and own 1,000 or fewer acres of qualifying land. Authorizations may be obtained for exceptions of up to 5,000 acres. Depending on funding, the open application period varies. Contact the nearest NRCS or Tim Kennedy at the Boise IDL for more information and applications. Additional information on the program and NCRS contacts is available at <http://id.nrcs.usda.gov/programs.htm>.

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Video: Firewise Landscaping, Part 2-Design and Installation.

Video: Firewise Landscaping, Part 3-Maintenance.

Video: Wildfire Control--An Introduction for Rural and Volunteer Fire Departments.

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Appendix: Maps